International Journal of Otorhinolaryngology and Head and Neck Surgery
Kumarasekaran P et al. Int J Otorhinolaryngol Head Neck Surg. 2018 Mar;4(2):428-431
http://www.ijorl.com
pISSN 2454-5929 | eISSN 2454-5937

Original Research Article

DOI: http://dx.doi.org/10.18203/issn.2454-5929.ijohns20180702

Anatomical variations in patients with chronic sinusitis

Pragadeeswaran Kumarasekaran*, Rajprakash Dharmapuri Yaadhavakrishnan, Gurumani Sriraman

Department of Otorhinolaryngology, Shri Sathya Sai Medical College and Research Institute, Ammapettai, Kancheepuram, Tamil Nadu, India

Received: 09 November 2017
Revised: 23 December 2017
Accepted: 25 December 2017

***Correspondence:**
Dr. Pragadeeswaran Kumarasekaran,
E-mail: prage.k@gmail.com

ABSTRACT

Background: Chronic sinusitis is repeated bouts of acute infection or persistent inflammation of the sinuses. The range of anatomic variants that can interfere with the mucociliary drainage of osteomeatal complex including concha bullosa, deviated nasal septum, uncinate process variations, ethmoid bulla, paradoxical middle turbinate, agger nasi and Haller cells. This is also important in surgeon point of view to know about detail knowledge of lateral nasal wall, paranasal sinuses, surrounding vital structures and anatomical variation.
Methods: Observational case series study in which 90 cases of chronic rhinosinusitis patients attending the ENT outpatient department from November-2015 to November-2016 in Shri Sathya Sai Medical college and Hospital, who had chronic sinusitis for more than three months duration not responding to the medical line treatment and who are willing to undergo functional endoscopic sinus surgery are studied and statistically analysed.
Results: In our study we found anatomical variation in 93% of chronic sinusitis patients. In our study it was observed that 52% of patients with two anatomical variation, 41% patients presented with single anatomical variation and 7% patients presented with no anatomical variation. In our study deviated nasal septum was the most common anatomical variant noted followed by unilateral concha bullosa, medialized uncinate process, paradoxical middle turbinate, haller cell and agger nasi.
Conclusions: In our study it was concluded that presence of anatomical variations is common in patients with chronic sinusitis. Presence of more than one anatomical variations significantly contributes to disease process. Deviated nasal septum is the most common anatomical variation in our study followed by concha bullosa, medialized uncinate process.

Keywords: Deviated nasal septum, Functional endoscopic sinus surgery, Computerised tomography, Chronic rhinosinusitis, Middle turbinate

INTRODUCTION

Chronic sinusitis is repeated bouts of acute infection or persistent inflammation of the sinuses. Its diagnosis relies on clinical judgment based on a number of often vague physical complaints and symptoms and with help of conventional anterior and posterior rhinoscopic examination.

The range of anatomic variants that can interfere with the mucociliary drainage of ostiomeatal complex including concha bullosa, deviated nasal septum, uncinate process variations, ethmoid bulla, paradoxical middle turbinate, agger nasi and haller cells. This is also important in surgeon point of view to know about detail knowledge of lateral nasal wall, paranasal sinuses, surrounding vital structures and anatomical variation.[1,2] The imaging signs suggestive of chronic sinusitis are: mucosal thickening,

sinus opacity, retention cyst, and bone changes such as deformity or sclerosis that indicate osteitis and polyposis. Untreated chronic sinusitis can result in severe complications such as orbital cellulitis, osteomyelitis, subdural empyema, frontal lobe abscess, cavernous sinus thrombosis, and death.

Variations and tomographic signs of sinusal disease occurring on the same side reinforce the likelihood of interference with the mucus drainage process. Computed tomography and diagnostic nasal endoscopy offers detailed study of anatomical variations.[1]

Aim

To know the common anatomical variation in patients with chronic sinusitis.

METHODS

Observational case series study in which 90 cases of chronic rhino sinusitis patients attending the ENT outpatient department from November 2015 to November 2016 in Shri Sathya Sai Medical college and Hospital, who were diagnosed as chronic sinusitis with clinical findings either in imaging or diagnostic nasal endoscopy are studied and statistically analysed.

***Sample size*:** 90

***Duration*:** 1 year (November-2015 to November-2016)

Selection criteria

Inclusion criteria were patient who were diagnosed as chronic sinusitis with clinical findings in CT nose and PNS; patient of both sexes, age between 12-40.

Exclusion criteria were patient with complaints of headache or facial pain, with no clinical findings suggestive of sinusitis; patient age less than 12 years, more than 40 years; patient with fungal sinusitis, immotile cilia syndrome were excluded; patient with previous history of FESS.

Patients attending ENT outpatient department with symptoms like facial pain, post nasal drip, nasal obstruction, loss of smell and nasal discharge in which the patient having more than two symptoms lasting for more than 12 weeks were subjected for DNE followed by CT nose and PNS. Patients who were having chronic rhinosinusitis in CT nose & PNS are studied and statistically analysed.

RESULTS

A total of 90 patients of chronic rhinosinusitis were examined. Presence of various anatomical variants in relation to chronic rhinosinusitis was observed.

Table 1: Frequency table for anatomical variation in chronic sinusitis.

Anatomical variation	Frequency	Percentage (%)
Deviated nasal septum	73	81.11
Concha bullosa	29	32.2
Medialized uncinate process	19	21.1
Paradoxical middle turbinate	13	14.4
Haller cell	3	3.3
Agger nasi	6	6.6
Onodi cell	7	7.7

In our study out of 90 patients 60 patients were male and 30 patients were female.

Table 2: Frequency table for gender.

Gender	Frequency	Percentage (%)
Male	60	66.7
Female	30	33.3
Total	90	100.0

This table explains 67% were male and 33% were female in the ratio of 2:1.

Table 3: Frequency table for age.

Variable	N	Minimum	Maximum	Mean
Age	90	19.00	49.00	33.7167

The minimum age was 19 and maximum age was 49. The average age was 33.In our study it was observed that 52% of patients with two anatomical variation, 41% patients presented with single anatomical variation and 7% patients presented with no anatomical variation. In our study deviated nasal septum was the most common anatomical variant noted followed by unilateral concha bullosa, medialized uncinate process, paradoxical MT, Haller cell and agger nasi.

DISCUSSION

The surgical management of chronic sinusitis has reached new heights after the advent of endoscope and high resolution CT scan. It also helps in assessing the anatomical variation pre operatively and act as a road map for surgeon. Many authors believe that anatomical variation of nose and paranasal structures may predispose patients to recurrent sinusitis.[2,3] Sinonasal region which has many anatomical variation plays an important role in the pathogenesis of chronic sinusitis.[4]

Anatomical variation assessed pre operatively through endoscope and CT nose and paranasal sinus which helps the surgeon for performing FESS without any hindrance.

In our study we found anatomical variation in 93% of chronic sinusitis patients.[5] In our study it was observed that 52% of patients with two anatomical variation, 41% patients presented with single anatomical variation and 7% patients presented with no anatomical variation. In our study deviated nasal septum was the most common anatomical variant noted followed by unilateral concha bullosa, medialized uncinate process, paradoxical middle turbinate, Haller cell and agger nasi (Table 1).

Deviated nasal septum

Deviated nasal septum (DNS) is present in 20-30% of general population, severe deviation is found to be a contributing factor for chronic sinusitis.[6] In our study 81% patient had a septal deviation[7] which is the major anatomical variation found in most of the chronic sinusitis patient (Table 1) however some studies did not demonstrated a causal relationship between DNS and sinusitis.[8]

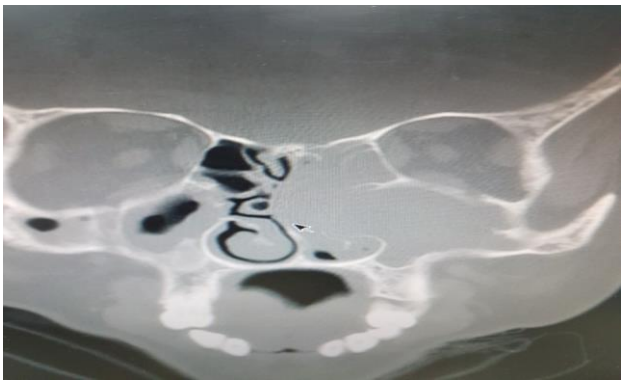

Figure 1: Arrow head indicating DNS.

Concha bullosa

Concha bullosa which blocks the osteomeatal complex and affects the muco ciliary clearance. Concha bullosa is found to be aetiological factor for recurrent chronic sinusitis.The size of concha bullosa is also an important factor for the contribution for chronic sinusitis. This is the second most common anatomical variation of 29% in our study resulting in chronic sinusitis (Table 1). Out of 29% of patients 23% had a unilateral concha bullosa and 6% of patient had bilateral concha bullosa.[9,10]

Figure 2: Arrow head showing concha bullosa.

Medialized uncinate process

The superior part of the uncinate deviate can deviate medially, laterally out of the middle meatus. These variations narrow infundibulum causing sinusitis. Pneumatization of uncinate process also can happen causing impaired ventilation in anterior ethmoid, frontal recess. In our study, 21% of the patients had medialized uncinate process.[11]

Paradoxical middle turbinate

Reverse curvature of the middle turbinate (paradoxical middle turbinate) can lead on to impingement of middle meatus caising sinusitis. In our study, 14.4% (Table 1) of the patients had paradoxical middle turbinate.[12]

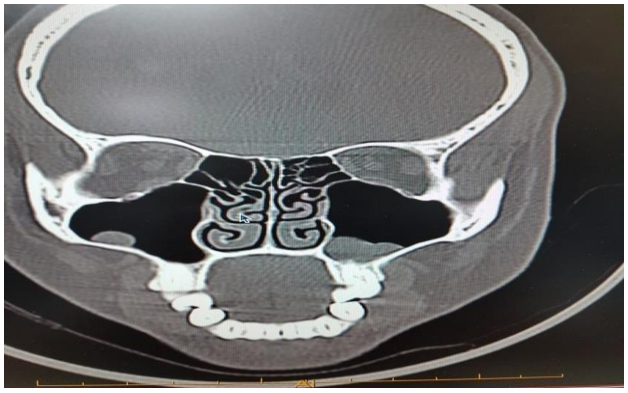

Figure 3: Arrow head showing paradoxical middle turbinate.

Agger nasi

Agger nasi cells lie anterior to anterosuperior attachment of middle turbinate and strongly contribute to frontal sinus disease.[13] But in our study we had only 6.6% (Table 1) of the patients had agger nasi.

Figure 4: Arrow head showing agger nasi.

Haller cell

Haller cell are ethmoidal air cells seen in the floor of orbit and narrows the maxillary ostium and infundibulum

and affects the mucociliary function causing sinusitis. In our study, 3.3% (Table 1) of the patients had haller cell.[14]

Onodi cell

Onodi cell is the posterior most ethmoidal air cell which extends posteriorly and laterally over sphenoid sinus. Presence of onodi cell increases the chance of injury to internal carotid artery and optic nerve while doing FESS if not identified preoperatively. In our study, 7.7% (Table 1) of the patients had onodi cell.[15]

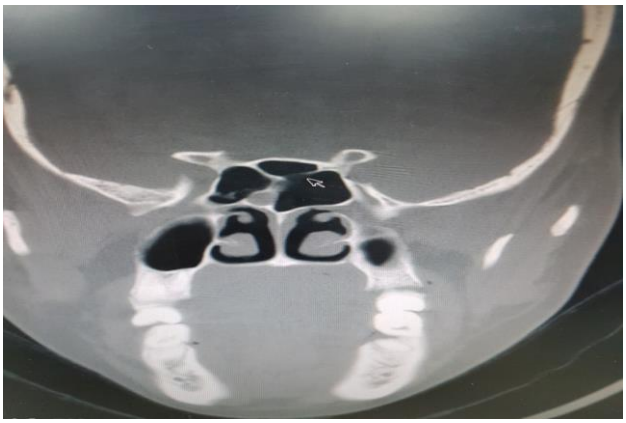

Figure 5: Arrow head showing onodi cell.

CONCLUSION

In our study it was concluded that presence of anatomical variations is common in patients with chronic sinusitis. Presence of more than one anatomical variations significantly contributes to disease process. DNS is the most common anatomical variation in our study followed by concha bullosa, medialized uncinate process.

CT scan helps in identifying the anatomical variation which is most important in patients undergoing Endoscopic sinus surgery. It also helps in preventing major complication during ESS. Knowledge of CT scan in anatomical variation helps in making surgical decision. This study has its own limitation of retrospectively having a small number of patients. In this study we focus only on anatomical variation and there relation with CRS.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Kumarasekaran P, Yaadhavakrishnan RD, Sriraman G. Anatomical variations in patients with chronic sinusitis. Int J Otorhinolaryngol Head Neck Surg 2018;4:428-31.